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TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

May 9, 2012

Mr. Gary G. Miller
Remedial Project Manager
U.S. EPA, Region 6
Superfund Division (6SF-RA)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Re: *Draft Baseline Ecological Risk Assessment (BERA)*, dated March 2012
San Jacinto River Waste Pits Federal Superfund Site
Harris County, Texas

Dear Mr. Miller:

The Texas Commission on Environmental Quality (TCEQ) Remediation Division has completed review of the April 2012 Draft Baseline Ecological Risk Assessment (BERA). The Draft document was prepared by Integral Consulting Inc. and Anchor QEA, LLC. The TCEQ comments on the document from Vickie Reat of Technical Program Support Team and Dr. Linda Broach of the TCEQ Houston office are presented as Attachment.

If you have any questions please contact Vickie Reat at 512-239-6873 or myself at 512-239-6368.

Sincerely,

Ludmila Voskov, P.G.
Project Manager
Superfund Section
Remediation Division

LV/sr

Attachment

cc: Vickie Reat, TCEQ
Chuck Stone, TCEQ

659078

Attachment

TCEQ Interoffice Memorandum

To: Ludmila Voskov, Project Manager, Superfund Section, Remediation Division

From: Vickie Reat, Technical Program Support Team, Division Support Section, Remediation Division

Date: May 4, 2012

Subject: Draft Baseline Ecological Risk Assessment (BERA)
San Jacinto River Waste Pits Superfund Site
Prepared by Integral Consulting Inc.
March 2012

I have reviewed the subject document as requested and my comments are detailed in this memo. These comments also reflect input from Dr. Linda Broach of the TCEQ Houston office.

General Comments

1. Evaluation of Threatened and Endangered Species – U.S. EPA previously commented (see June 3, 2010 letter regarding review of the draft RI/FS Work Plan and SLERA, Comment 41) that if state or federally listed threatened or endangered wildlife species could occur in the vicinity of the Site, the BERA should designate a surrogate species for the protected species, and base any hazard quotient calculations or risk characterization on the NOAEL TRV (no-observed adverse effect level toxicity reference value) or equivalent. The PRPs agreed with the response and indicated that the text of Appendix B and Attachment B1 would be modified to address the appropriate surrogate species for any listed species that may occur at the Site. Appendix B of the RI/FS work plan generally stated (Section 2.3.2) that the risk assessment for the protected species would not employ the use of surrogates because of the potential to overestimate risk to these listed species, that realistic exposure parameters would be identified for these species, and species specific exposures would be evaluated against the appropriate TRVs in the BERA.

   The BERA did imply or state (Section 3.4.4) that the sandpiper would make an appropriate representative for the white-faced ibis, a State-threatened species, due to similar feeding/foraging strategies. Because the NOAEL hazard quotients for copper (central tendency (CT) = 2; reasonable maximum exposure concentration (RM) = 3) and TEQ_{DFP} (CT = 10; RM = 30) were greater than 1, this deserves a more robust discussion/analysis (TEQ_{DFP} denotes the toxicity equivalent (TEQ) concentrations calculated using dioxins and furans and dioxin-like PCBs). The text simply states that the ibis would only be an occasional visitor to the Site and its exposure potential is considered low.

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2. Post TCRA (Time-Critical Removal Action) -Scenarios – Hazard quotient calculations were presented for the baseline site (before placement of the TCRA), and after TCRA placement. For the post-TCRA analysis, the evaluation assumed that $COPC_E$ (chemical of potential ecological concern) concentrations in sediments within the TCRA footprint (i.e., sediment or soil samples collected from within the original 1966 perimeter of the impoundments north of I-10) are equal to the median concentration of the chemical in the upstream background sediment dataset or the background soil dataset. Additionally, pre-TCRA tissue concentrations were used in post-TCRA analyses.

   The following comments/questions should be considered:
   - There is no question that the TCRA has likely minimized exposure to dioxins and furans for many exposure pathways. However, the assumption that the TCRA sediment and soil concentrations are equivalent to background concentrations is just that. Without actual tissue and sediment data, the impact of the TCRA remains unknown.
   - Use of the background median in place of baseline Site concentrations assumes that the sediments immediately surrounding the Site reflect the same baseline concentrations. It is possible that Site sediments with more elevated TEQ concentrations could have been displaced and deposited adjacent to the TCRA during TCRA construction. We suggest additional sediment monitoring to determine surficial sediment concentrations immediately adjacent to and just beyond the TCRA footprint.
   - The presumption that the Site post-TCRA will continue to remain devoid of habitat assumes that the Site will be maintained to prevent this from happening.

Specific Comments

3. 4.1.1 Estimated Water Concentrations (Exposure of Benthic Macroinvertebrates) - Looking at Equation 4-2, our presumption is that the f_{oc} used is sample-specific. Please confirm.

4. 4.1.3 Results of the Benthic Macroinvertebrate Exposure Evaluation - We suggest that the BERA provide a table that summarizes the estimated sediment pore water concentrations (i.e., mean, maximum, minimum, number of samples) for the various $COPC_E$s evaluated in this manner for the benthic exposure pathway.

5. 4.2.1 $COPC_E$ Concentrations in Fish Diets - The referenced citation (Meador et al. 2010) should reflect a 2011 date.

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6. 4.2.2 Estimated Concentrations of Selected $COPC_{ES}$ in Surface Water - Table 4-3 displays the sediment SWAC (surface area-weighted average concentration) and the estimated surface water concentration for a number of $COPC_{ES}$. The methodology for calculating the values is not necessarily transparent. By way of example, please provide a table that displays the calculations for lead and nickel.

7. 4.2.5 Datasets Used to Evaluate Exposure to Fish - The references for the killifish movement/home range were not provided in the reference section. Please provide these full references.

8. 4.2.6 Results of Fish Exposure Assessment - Please relate the values in Table 4-6 with the exposure point concentrations in Appendix C, if applicable. If not applicable, please explain how these weighted concentrations were derived and indicate where the data is summarized so this can be verified to some extent. Finally, why is the total diet (last column in Table 4-6) simply the sum of each of the CT and RME values? Have the individual values for each food type already been modified by the proportion each food type represents in the diet?

9. 4.3 Exposure of Reptiles, Mammals, and Birds - Table 4-7 presents the exposure areas and assumptions for food/sediment/soil for various receptors. The exposure assumptions for the raccoon were a bit confusing. Presumably, concentrations in molluscs for the peninsula shoreline were used. It was not clear why this wasn't the case for small fish also since exposure point concentrations were presented for this subset in Appendix C. For terrestrial invertebrates and plants, it was unclear why concentrations were modeled from soil concentrations for soils north of IH-10 if soil ingestion was modeled for the entire peninsula. Please clarify/explain.

10. 4.3.1 Wildlife Exposure Model - Looking at the values for sediment (or soil) ingestion for the various wildlife receptors in Table 3-12, we assume that the F_s value is intended to be the fraction of the diet that is soil/sediment and that the units column should be blank. Please confirm.

11. 4.3.1.2 Relative Bioavailability Adjustment Factor - For the wildlife exposure model, the 2,3,7,8-TCDD concentration was multiplied by a relative bioavailability factor (RBA) based on a study by Nosek et al. (1992). In this study, adult ring-necked pheasant hens were administered a single dose of a suspension of TCDD radio-labeled earthworms, soil, paper mill sludge, or crickets. Radioactivity remaining in the bird carcass after 24-hours was measured. This adjustment applied to $TEQ_{DF\ B}$ for sediment and soil: shoreline, sediment outside of the western cell, shoreline background, post-TCRA shoreline, and soils north of IH-10. For tissue, this adjustment applied to $TEQ_{DF\ B}$ for common rangia (site-wide and background) and blue crab (site-wide and background). Additionally, this

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adjustment applied to $TEQ_{DF\,B}$ and $TEQ_{DF\,M}$ for terrestrial invertebrates north of IH-10 and the peninsula only. We do not support the use of the referenced RBAs for the following reasons:

- the bioavailability study is not site-specific
- uncertainty regarding the dose duration and measurement time (Was steady-state achieved?)
- selective uptake of TCDD in bird tissues
- uncertainty in the TCDD dose concentration compared with prey/media concentrations at the San Jacinto River Site.

12. 4.3.1.2 Relative Bioavailability Adjustment Factor - It is not clear how much this adjustment lowered the various $TEQ_{DF\,B}$ hazard quotients. For comparison, we suggest that Tables 6-6 and 6-7 be expanded to reflect $TEQ_{DF\,B}$ and $TEQ_{DFP\,B}$ hazard quotients without the use of the RBA factors.

13. 4.3.1.3 Unit Conversions - Regarding the conversion of tissue concentrations expressed as wet weight to dry weight, the text should indicate that this step was already performed (where appropriate) for each tissue sample based on the percent moisture/solids determined by the lab, and that the exposure point concentrations in Appendix C were determined after this conversion.

14. 4.3.1.5.1 Estimating $COPC_E$ Concentrations in Plants (Concentrations of $COPC_E$s in Foods of Alligator Snapping Turtle, Killdeer, Raccoon, and Marsh Rice Rat) - The full reference for the Staples et al. (1997) citation was not provided. Please add this to the reference section.

15. 4.3.1.5.2 Estimating $COPC_E$ Concentrations in Soil Invertebrates - Soil-to-invertebrate bioaccumulation factors (BAFs) for nickel and thallium were obtained from U.S. EPA (1999b) and are provided in Table 4-9. The BAFs are presented on a wet-weight basis in the U.S. EPA reference. Since the mammalian dose calculations are performed on a dry-weight basis, it is not clear if the estimated tissue concentrations were converted to dry weight. Please clarify and indicate the assumed moisture content.

16. 4.3.1.5.2 Estimating $COPC_E$ Concentrations in Soil Invertebrates - Burton et al. (2006) was used to establish BAFs for estimating tissue concentrations (based on Site soil concentrations) for mercury. According to the BERA discussion and Table 4-9, an uptake factor of 3.1 was used for soil concentrations less than or equal to 1.5 mg/kg, and an uptake factor of 0.7 was used for soil concentrations greater than 1.5 mg/kg. Since these BAF values were applied to individual surface soil

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sample locations, please add information in Appendix C that indicates the predicted CT and RM exposure concentrations for mercury for soil invertebrates.

17. 4.3.1.5.2 Estimating $COPC_E$ Concentrations in Soil Invertebrates - Regarding PCBs, the discussion indicates congener-specific models were not used to estimate invertebrate concentrations because there are no PCB congener data for soils at the Site. This is confusing since Table 4-12 indicates $TEQ_{P,B}$ values for the killdeer, Table 6-5 indicates hazard quotients for $TEQ_{P,B}$ for the killdeer, Table 6-9 indicates hazard quotients for $TEQ_{P,M}$ for the marsh rice rat and raccoon, and Table C-1indicates $TEQ_{P,B}$ and $TEQ_{P,M}$ values for soils north of IH-10. Please clarify and indicate how TEQ_P was evaluated for terrestrial receptors.

18. 4.3.1.5.2 Estimating $COPC_E$ Concentrations in Soil Invertebrates - Paired soil and earthworm tissue dioxin and furan data (n = 6) from the St. Regis Paper Company Superfund Site in Cass Lake, Minnesota were used to develop a series of regression and correlation relationships for dioxin and furan congeners. These were used to estimate dioxin and furan concentrations in soil invertebrate tissue for use in the wildlife exposure model for the killdeer and raccoon. For this analysis, P-values ≤ 0.1 were considered statistically significant, and significant regression relationships between soil and tissue were developed for 11 of the 17 congeners. For the remaining 6 congeners, correlation relationships were determined with other congeners. The resulting estimated concentrations of dioxins and furans (TEQ_{DF}) in terrestrial invertebrate tissue for the raccoon or killdeer exposure scenario are shown in Table D-6. Although Sample et al. (1996) is mentioned in the discussion, there is relatively little discussion of alternative approaches. Given the small sample size and the higher than normal threshold for the determination of statistical significance, the adequacy of this approach for estimating invertebrate dioxin/furan concentrations is questionable. Please compare/contrast this approach generally with other relevant dioxin/furan invertebrate uptake estimates in the peer-reviewed and/or CERCLA specific literature.

19. 4.3.1.5.2 Estimating $COPC_E$ Concentrations in Soil Invertebrates - The regression and correlation relationships developed from the Cass Lake Superfund site would not be expected to accurately predict soil invertebrate tissue concentrations at the San Jacinto River Site because the range of dioxin and furan concentrations in the 6 Cass Lake soil samples is much lower, especially for 2,3,7,8-TCDD and 2,3,7,8-TCDF. Additionally, the ratios between congeners in soils from the Cass Lake site are very different from congener ratios at the San Jacinto River Site. For the Cass Lake site, the highest 2,3,7,8-TCDD concentration was 1.83 ng/kg, and the highest 2,3,7,8-TCDF concentration was 11.3 ng/kg (Table D-1). In contrast, at the San Jacinto River Site, the highest soil 2,3,7,8-TCDD concentration was 8,650 ng/kg, and the highest 2,3,7,8-TCDF concentration was 20,600 ng/kg (Table 6-17 in

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PSCR). According to Appendix D, the 2,3,7,8-TCDD congener was not detected in 5/6 of the Cass Lake earthworm samples. In the one sample where 2,3,7,8-TCDD was detected in tissue, it was not detected in soil.

Because no statistically significant relationship between soil and earthworm concentrations was identified for some congeners, a correlation approach was used which compared the ratio of congener concentrations in earthworm tissue. The ratio between concentrations of 2,3,7,8-TCDF and 1,2,3,6,7,8-HxCDD was used to predict the 2,3,7,8-TCDF concentration in invertebrate tissue. For the Cass Lake site, the average 1,2,3,6,7,8-HxCDD concentration in soil was about 50 times greater than the concentration of 2,3,7,8-TCDF in soil. In contrast at the San Jacinto River Site, the average TCDF concentration in Area 3 soils was over 3,200 times the average 1,2,3,6,7,8-HxCDD concentration in soils (Table 6-17 in PSCR). This suggests that the use of the Cass Lake soil data will greatly underestimate the concentration of TCDF in invertebrate tissue at the San Jacinto River Site.

Given the significant difference in soil concentrations for TCDD and TCDF, and the uncertainty associated with the ratio approach, the adequacy of this approach for estimating invertebrate dioxin/furan concentrations is questionable. Again, please compare/contrast this approach generally with other relevant dioxin/furan invertebrate uptake estimates in the peer-reviewed and/or CERCLA specific literature.

20. 4.3.1.5.2 Estimating $COPC_E$ Concentrations in Soil Invertebrates - There is a statement in Section 2.1 of Appendix D that "the ranges of dioxin and furan concentrations in soil at the Cass Lake site were similar to the range of concentrations in soils at the San Jacinto River site." This should be revised. The total TEQ ranges may be similar, but the individual congener ranges were not.

21. 4.3.1.6 Wildlife Exposure Units - Figure 4-9 depicts the exposure areas and samples used for the killdeer evaluation. Please explain why all of the area on the west side of the upland sand separation area was used for the assessment when surface soil data was not available for the far western third of the property. Additionally, was this inclusion conservative?

22. 4.3.1.6 Wildlife Exposure Units - Figure 4-10 depicts the exposure areas and samples used for the raccoon evaluation. Very limited soil/sediment data was available for these areas and clams and small fish were not collected in this area. Please explain why all of the area along the west shoreline of the Southern impoundment and along the eastern shoreline on the land mass across the Old River Channel (and south of IH-10) was used for the assessment. Additionally, was

this inclusion conservative and how will it be integrated (if at all) with any ecological assessment for the Southern impoundment?

23. 4.3.1.6 Wildlife Exposure Units - Similarly, Figure 4-11 depicts the exposure areas and samples used for the great blue heron, spotted sandpiper, and marsh rice rat evaluations. Very limited sediment data was available for the areas south of IH-10, and clams and small fish were only collected in an area along the east side of the river channel shoreline (and south of the IH-10 bridge). It is not clear how data from these areas will be incorporated into the exposure calculations. Please clarify. Additionally, was this inclusion conservative and how will it be integrated (if at all) with any ecological assessment for the Southern impoundment?

24. 4.3.1.7 Calculation of Exposure Point Concentrations - Please amend Appendix C to include the surface water CT and RM exposure point concentrations for TEQs and Total PCBs that were used for determining the bird dose (i.e., surface water ingestion).

25. 4.3.1.9 Results - The text states that the results of calculations using BAFs and regression models for invertebrates and plants were not tabulated, but were incorporated directly into the wildlife exposure model. For transparency, this particular part of the dose calculation should be presented along with the corresponding soil/sediment exposure point concentration.

26. 4.3.1.9 Results - Table 4-12 presents the final estimates of the daily ingestion rate of each $COPC_E$ for each receptor. We were not able to duplicate the values indicated for the raccoon. Please confirm the calculations. This may be related to uncertainty associated with the exposure areas assumed for the raccoon (i.e., see comment 9).

27. 4.3.2.1.2 Implementation of the Prey-to-Egg Model (Estimated TEQ Concentrations in Bird Eggs) - The linear regression models for each congener or homologue group from Elliott et al. (2001) were used to estimate egg concentrations for the blue heron, cormorant, and sandpiper. The regression equations are shown in Table 4-13. Levels of 2,3,7,8-TCDF were not linearly related for fish and egg concentrations ($p = 0.07$). Please discuss the uncertainty associated with the use of the Elliot, et al. (2001) model for this congener.

28. 4.3.2.1.2 Implementation of the Prey-to-Egg Model (Estimated TEQ Concentrations in Bird Eggs) - The discussion on page 4-29 explains that for the fish-to-egg calculations, an individual sample of each medium was used to represent the CT and RM exposures. The sample selected was that with the $TEQ_{DF,B}$ concentration closest to the calculated CT or RM for the particular exposure unit.

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Please provide more discussion why this calculation method was selected and the location, sample number, and congener and homologue concentrations of the individual samples selected for use. Additionally, this discussion states that it was considered overly conservative to use the CT and RM for each congener to estimate the concentrations of dioxins and furans in bird eggs. Please explain this statement.

29. 4.3.2.1.2 Implementation of the Prey-to-Egg Model (Estimated TEQ Concentrations in Bird Eggs) - The results of the TEQ calculations using the regression models to estimate concentrations in eggs of the neotropic cormorant, the great blue heron, and the spotted sandpiper are shown in Table 4-15. For transparency, please show the step-by-step calculation of the values in Table 4-15 for the combinations that follow. This would include presentation of the individual congener concentration EPCs (in food and sediment) as inputs to the calculation.
    - Cormorant/TCFD/prey only/CT/TEFmax
    - Heron/PeCDD/prey + sediment/RM/TEFmin
    - Sandpiper/∑HxCDF/prey + sediment/CT/TEFmin

30. 4.3.2.1.2 Implementation of the Prey-to-Egg Model (Estimated TEQ Concentrations in Bird Eggs) - It appears that the TEF/TEQ values are missing for the heron and sandpiper (Table 4-15, background: prey + sediment). Please provide these values or explain why they were not presented.

31. 4.3.2.2.1 Overview of Literature Found (Estimating PCB Concentrations in Bird Eggs) - The complete reference for Naito and Murata (2007) was not provided in the list of references. Please add this to the list of references. Additionally, the actual BMFs (biomagnification factors) in this paper were cited from other papers.

32. 4.3.2.2.1 Overview of Literature Found (Estimating PCB Concentrations in Bird Eggs) - The results of the TEQ calculations using the indicated BMFs (Table 4-16) to estimate PCB concentrations in eggs of the neotropic cormorant, the great blue heron, and the spotted sandpiper are shown in Table 4-17. For transparency, please show the step-by-step calculation of the values in Table 4-17 for the combinations that follow. This would include presentation of the individual PCB congener concentration EPCs (in food and sediment) as inputs to the calculation.
    - Cormorant/PCB 105/prey + sediment/CT
    - Cormorant/PCB 126/background: prey + sediment/RM
    - Heron/PCB 077/background: prey/RM
    - Sandpiper/PCB 118/prey only/CT

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33. 4.3.2.3 Egg Exposure Scenarios - Previous sections detail the approach for estimating egg TEQ_{DF} and TEQ_P concentrations using regression equations or BMFs applied to empirical fish tissue concentrations. This information is needed to evaluate potential risks to birds by comparing estimated TEQ concentrations in eggs to TRVs expressed as egg concentrations (wet weight). Exposure scenarios detailed here reflect an evaluation of egg concentrations resulting from combinations of prey (fish, crabs, or common rangia) and sediment. Please provide clarification how egg tissue concentrations were estimated based on uptake from sediment, crabs, and common rangia. This is not clear.

34. 4.4.2 Derivation of Parameter Distributions - Table 4-19 displays the distribution characteristics for the various exposure parameters used in probabilistic risk analysis. Please discuss why any particular reference (e.g., DREBWQAT (1999) and Fernandes (2011)) was used here, and not in the initial dose calculations. Also, please explain a triangular distribution.

35. 5.3 Benthic Macroinvertebrate Communities - Notes f, h, and i are missing from Table 5-1. Please revise this table to include these.

36. 5.3 Benthic Macroinvertebrate Communities - The marine chronic criterion for lead (Texas Surface Water Quality Standards (TSWQS), §307.6 (c)) of 5.3 ug/L should be used for evaluating estimated pore water concentrations as this value is more conservative that the federal criterion. This is an ARAR (Applicable or Relevant and Appropriate Requirement). We note that this was not used as a screening value since the ER-L/ER-M screening values for bulk sediment had preference.

37. 5.3 Benthic Macroinvertebrate Communities - For the evaluation of reproductive risks for molluscs, the BERA used the paired NOAEC/ LOAEC (no-observed adverse effect concentration/lowest-observed adverse effect concentration) values of 2 and 10 ng TCDD/kg ww tissue, respectively, for delayed gonadogenesis in males (Wintermyer and Cooper (2007). An NOAEC of 2 ng TCDD/kg ww tissue is too high given that this concentration has been found to adversely affect early stages of oyster gametogenesis (Wintermyer and Cooper (2007) and veliger larval survival (Cooper and Wintermyer (2009). We suggest that the 2 ng TCDD/kg ww tissue concentration should be the LOAEC, and a lower NOAEC should be determined based on an appropriate literature value.

38. 5.3 Benthic Macroinvertebrate Communities - Continuing with a discussion of the NOAEC/LOAEC values for molluscs, the referenced studies only dosed the molluscs with 2,3,7,8-TCDD, whereas the molluscs at the site are potentially exposed to all of the dioxin and furan congeners. Thus Site molluscs would have a

greater exposure to total dioxins/furans overall. This compounds the uncertainty associated with the selected tissue residue endpoint for molluscs. Please evaluate.

39. 5.4 Fish - For nickel, the results of tests with marine fish were combined to determine a chronic TRV for nickel expressed as a concentration in water (3,600 ug/L; Table 5-2 and Table B-16). The marine chronic criterion for nickel (TSWQS, §307.6 (c)) of 13.1 ug/L should be used. This is an ARAR.

40. 5.4 Fish - The TRVs (NOAEL and LOAEL fish whole body concentrations) for Total PCBs are summarized in Tables 5-2 and B-11 and are discussed in Sections 2.2.1.1 and 2.2.1.2 of Appendix B. These TRVs are largely based on studies where fish were exposed to Aroclor 1254 and tissue was analyzed for Total PCBs. Please briefly discuss the uncertainty associated with the use of Aroclor toxicity data relative to the congener tissue data used for the BERA.

41. 5.4 Fish - Regarding the TCDD TRV (from Steevens et al. (2005)), our understanding is that the tissue residue TRV is based on concentrations in fish eggs and embryos rather than whole fish. Please clarify. It appears that whole fish concentrations are used in the hazard quotient calculations (Section 6.3.4).

42. 5.6 Birds and Mammals - The avian and mammalian TRVs for Total PCBs are summarized in Tables 5-3, 5-4, and B-11 and are discussed in Sections 2.2.3 and 2.2.4 of Appendix B. These TRVs are largely based on studies where birds or mammals were exposed to Aroclor 1254 in their diets. Please briefly discuss the uncertainty associated with the use of Aroclor 1254 (primarily) toxicity data relative to the total PCB (sum of aroclors) tissue and sediment data used for the BERA.

43. 5.6 Birds and Mammals - Please re-evaluate the calculated NOAEL and LOAEL values for the avian TRVs for barium. We were not able to duplicate the values indicated in Table 5-3 based on the text in Section 3.2.2 of Appendix B. Please evaluate the indicated TRVs. Presumably this would be relevant for the SLERA for the area south of IH-10 since barium is not a $COPC_E$ for wildlife receptors for the area north of IH-10.

44. 6.2 Risks to Benthic Macroinvertebrate Communities - This discussion generally compares the various screening values with the bulk sediment or estimated pore water concentrations, indicates the number of exceedances, and plots the sample locations on a series of figures. This discussion should be revised to indicate the concentrations (i.e., bulk sediment or estimated pore water) that exceeded the screening values.

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45. 6.2.3 TCDD in Clam Tissue Relative to the Critical Tissue Residue for Molluscs - Potential risks associated with critical tissue residue in molluscs should be re-evaluated given our concerns regarding the selected tissue NOAEC/LOAEC values.

46. 6.2.3 TCDD in Clam Tissue Relative to the Critical Tissue Residue for Molluscs - Absent confirmation sampling, it is unknown whether risks to molluscs in the vicinity of Transect 3 have been greatly reduced as a result of the TCRA.

47. 6.2.5 Summary: Lines of Evidence for Benthic Macroinvertebrate Communities - The actual risks to populations of molluscs (based on tissue concentrations of dioxins/furans) is unknown. Additionally, consideration of potential risks to molluscs directly adjacent to the impoundment or elsewhere on the Site will be driven by the selected tissue NOAEC/LOAEC (see comments for Section 5.3).

48. 6.3.1 Estimated Concentrations of Metals in Fish Diets Relative to TRVs - Hazard quotients for fish exposed to cadmium, copper, mercury, and zinc in foods and sediment are summarized in Table 6-3 and indicate that the LOAELs are not exceeded. The hazard quotient calculations are fairly straightforward. We will revisit these hazard quotients when a response to comment 8 is received.

49. 6.3.2 Estimated Concentrations in Surface Water Relative to TRVs - A hazard quotient of less than 0.1 was determined for fish exposed to nickel in surface water (Table 6-4). The hazard quotient will be above one using the chronic Texas criterion. See previous comments 6 and 39.

50. 6.3.3 Total PCB Concentrations in Whole Fish Relative to the TRV for Fish - See previous comment 40 regarding the toxicity studies used to derive the fish whole body TRVs.

51. 6.3.5 Summary: Lines of Evidence for Fish - This discussion concludes that overall, risks to fish on the Site are negligible. We will revisit this conclusion upon receipt of responses to previous comments regarding the exposure concentrations (surface water), diet, and TRVs for fish.

52. 8.2 Characterization of Risks to Fish - The discussion summarizes that baseline risks to the assessment endpoints (stable or increasing populations of benthic omnivorous fish, benthic invertivorous fish, and benthic piscivorous fish on the Site) are negligible. As previously stated, we will revisit this conclusion upon receipt of responses to previous comments regarding the exposure concentrations (surface water), diet, and TRVs for fish.

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53. 8.6 Ecological Risk Assessment Conclusions - The overall risk assessment conclusions will be revisited after receipt of a revised BERA and accompanying responses to agency comments.

Appendix E : Draft Screening-Level Ecological Risk Assessment, South Impoundment

54. 2.5 Assessment Endpoints - Looking at Table E-3 (assessment endpoints), the assessment endpoint for mammals does not pair up with the selected receptor (pocket gopher) since it is an herbivorous mammal. We suggest the addition of an omnivorous mammal (e.g., shrew, marsh rice rat, or armadillo) and revision of Table E-3.

55. 3.2 Ecological Risk-Based Screening Methods - For the SVOCs, footnotes should be added to Table E-5 to indicate where the median value for the Site-specific background concentrations was used. Additionally the explanation for note c is unclear (also in Table E-6). Please clarify.